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Planning for Bicycle Infrastructure in Military Installations: A Proposed Bicycle Network for Sheppard AFB

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Planning for Bicycle Infrastructure in Military Installations: A Proposed Bicycle Network for Sheppard AFB

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Abstract

Planning for Bicycle Infrastructure in Military Installations: A Proposed Bicycle Network for Sheppard AFB

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Sustainable transportation planning is becoming increasingly important as greenhouse gas emissions continue to rise and affect global climate change. Cities have started to engage in active transportation planning for bicycles and pedestrians as part of the larger sustainable transportation planning effort. Military installations should also be engaging in this type of planning, particularly for bicycles. The federal government has identified priorities related to reducing greenhouse gas emissions, making military bases more livable, and increasing the health and fitness of service members, all of which could be addressed with a bike plan. There are also planning documents produced by the Department of Defense that support sustainable planning practices on bases, including specifically bicycle planning. To see how these priorities and planning practices could be implemented on a base, a case study was conducted which looked at Sheppard Air Force Base in Wichita Falls, TX. A bicycle network and programming strategies were proposed for the base, taking into consideration the specific needs and challenges that Sheppard Air Force Base faces.

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Chapter 1: Introduction

Cycling's increase in popularity as a method of transportation is apparent in many US metro areas. Bike share programs, bicycle lanes and paths, and bicycle-specific crossing signals all indicate that cities are becoming more accommodating to cyclists. Cycling is appealing as a form of transportation for many reasons. One of the benefits is the reduced environmental impact of a bicycle compared to a car. The transportation sector contributes significantly to greenhouse gas emissions, and as populations continue to grow, this problem will only increase. Greenhouse gas emissions are harmful to the earth's atmosphere, and contribute to global climate change (United Nations). Embracing alternative transportation methods, such as cycling, is one component of a larger effort to reduce greenhouse gas emissions and address climate change. Cycling also has the added benefit of increasing physical activity levels, which is increasingly important in a country where approximately one in three adults is clinically obese (Craig M. Hales). Commuters in the U.S. have been realizing these benefits as cycling has become a more popular option, with the number of commuting trips rising from 1.7 billion in 2001 to 4 billion in 2009 (The League of American Bicyclists).

As the popularity of cycling has grown, efforts to create safe and accessible bicycle infrastructure have increased. Many metropolitan planning organizations (MPOs), counties, municipalities, and university and business campuses have comprehensive bicycle or active transportation plans that detail a vision for growth in their bicycle network and infrastructure. Community support for biycling has increased as well, with advocacy groups lobbying for safer riding conditions and larger bicycle networks. The research presented in this paper will show that military bases would also benefit from increased bicycle planning efforts. Currently, most bases do not plan intentionally for

bicycle infrastructure. Without a plan in place, critical connections may be missing from a bicycle network that make it less usable for riders. Planning for bicycle infrastructure ensures that popular origins and destinations are connected in a safe and accessible way.

Many military bases operate like small, self-contained cities. Similarly, just as cities rely on a planning division to lead planning efforts, military bases have community planners on staff that create comprehensive plans, plan for new development, manage redistribution and building optimization, and work with bordering commnuities to mainrain relationships and ensure compatible use of adjacent lands. The military base equivalent of a comprehensive master plan is known as an Installation Development Plan (IDP). IDPs are similar in scope to a small municipality's comprehensive plan. The content of an IDP is regulated by the Department of Defense (DoD) through a Unified Facilities Criteria (UFC) document which details the minimum requirements for every IDP. All IDPs must be reviewed at least once annually, but may be reviewed more frequently if necessary in order to remain relevant and useful as a planning tool (Department of Defense 23). UFCs are living documents that provide planning, design, construction, restoration, and modernization criteria to all military department, defense agencies and DoD field activities. UFC's are periodically reviewed and updated by the U.S. Army Corps of Engineers, Naval Facilities Engineering Command, and the Air Force Center for Engineering and the Environment. In addition to periodical review, users of UFC documents have the ability to submit a criteria change request if they have recommended changes. The current UFC document for Installation Master Planning was last updated in November of 2018 (Department of Defense).

The physical conditions of a military base provide a good foundation for bicycle planning. Military bases range in size, but often a majority of the land area is open space that is used for training, air space, or conservation. For example, Fort Hood in Killeen,

TX is one of the largest bases at over 330 square miles. However, the part of the base where most people live, work, and shop, is only approximately six square miles. In contrast, Sheppard Air Force Base (SAFB), the base used as a case study in this report, is quite small, with an total area of nine square miles.The distances between points of interest may not be within a comfortable walking distance of 10 minutes or ¼ mile walk, but they are usually within a 10 minute bike ride (Walker). Speed limits on base are usually 30 miles per hour on major streets, and can be lower in housing areas. Traffic is generally higher during peak commute times and around popular destinations such as the grocery store or gym. The barrier to biking on base is likely not distance, but the lack of infrastructure to create a connected, safe network.

In addition to having physical conditions that provide good opportunities for bicycle planning, military bases stand to benefit from increasing biking on base.. Encouraging active transportation helps to address the problem of obesity within the military. Service members are required to maintain a certain level of physical fitness in order to retain their position. In 2012, approximately 5,600 service members were dismissed for being overweight or out of shape. This places a burden not just on the military, but on tax payers as well. The total cost of recruiting, screening, and training the replacement personnel was approximately half a billion dollars per year (Department of Defense 10).

Beyond the physical fitness benefits for service members, another important motivation for bicycle planning on military bases is direction from the federal government to engage in more sustainable planning practices and create more livable bases. Engaging in sustainable practices encourages bases to use their limited resources more effectively. Compact, walkable and bikable development can be a lot more affordable than traditional sprawl development, and the military has taken notice. Many

of the benefits listed in the current UFC for sustainable planning have to do with cost savings (Snyder). A connected bike network is one component of a more livable community, and encourages future development to be concentrated within the established network. This results in more infill development, which can save the military a lot of money by reducing the need for Envioronmental Impact Statements (EISs). EISs are required for all federal construction projects. They are more costly and time-consuming when prepared for projects on previously undeveloped land, because there are more unknowns about potential impacts of a project to the area.

Creating more livable bases also helps to address the more recent problem of base housing not being a popular option among service members. Many service members are not required to live on base, and can choose to live off base instead. This is necessary to a degree, because there is usually not enough housing on base to house all the service members. However, it is not beneficial to have empty housing units on base because the military is paying to maintain them. A lack of people living on base also results in fewer people using the amenities on base – such as the chapel, the movie theater, etc. Without regular patronage, it is hard to financially justify keeping these services open. It is important to the military to continue to offer these services on base and to have service members living on base because it helps to create a sense of community. Service members are often not located near extended family, and when people get deployed or go on work trips often, it can leave their spouses and children without a support system. If these families live off-base, they are further disconnected from a potential community that could offer support (Snyder).

Questions to be Addressed

1. What federal policies and programs support bicycle planning?
2. What benefits does bicycle planning provide service members?
3. What standards and regulations are in place for implementing a bike plan on a military base?
4. What could a proposed bicycle network look like for Sheppard Air Force Base?

Research Methods and Case Study Site Selection

The research methods for this paper include a literature review and a case study analysis. The literature review provides the context for planning efforts on a military base; it details federal policies and current planning practices that provide guidance and justification for bicycle planning. This research is then applied to a case study of SAFB in Wichita Falls, TX, to propose a bicycle network and programming to promote cycling. The case study location in this paper was selected through research and consultation with current base planners located at Joint Base San Antonio in San Antonio, TX. In many ways, SAFB and other Air Force bases are quite similar – something that is done on purpose by base planners to create a sense of familiarity for service members who frequently move every couple of years (Gillem 77). Despite this, SAFB does have some unique characteristics that make it particularly well suited for a bicycle network. The compact size, high population of young airmen, and popularity of biking in the surrounding town all help make SAFB a prime location for a bicycle network.

Chapter 2: Bicycle Planning in the Military Context

Military and Air Force Background

The US military is organized through the Department of Defense and consists of four branches: the US Air Force, US Army, US Navy, and US Marine Corps (Department of Defense). Each branch has its own mission, the US Air Force's mission is to "fly, fight, and win in air, space, and cyberspace" (U.S. Air Force). Currently, there are over 320,000 active duty service members and over 140,000 civilians employed by the Air Force (U.S. Air Force). In order to support the overarching mission, there are many wings of the Air Force, each with their own specific mission. The base used as a case study in this paper, SAFB, is home to two wings, the 82nd Training Wing and the 80th Flying Training Wing (U.S. Air Force). All base activities are intended to support the mission, or support the service members who are supporting the mission.

Military Base Setting

Military bases are not only where service members work, it is also where many of them and their families, known as dependents, live, relax, shop, and more. Many military bases include the following amenities, at a minimum:

- Mix of housing
- Guest lodging
- Commissary (grocery store)
- Base Exchange (goods store)
- Food court
- Gas station/shoppette (convenience store)
- Dry cleaners

- Library
- Bowling alley/movie theater
- Child development center (daycare)
- Gym
- Chapel

Bases try to offer everything service members and their families may need, but people will often choose to leave base to shop, eat, attend local events, and more.

Bases have limited access points which are strictly controlled by armed service members. Those that have authorized base access must present identification at an entrance gate in order to gain access. Many of the services on base are limited to active duty service members, their dependents, and retired service members, and are not accessible by civilians who work on the base. Base access gates are often busiest during rush hour times because usually there is not enough housing on base to support all of the employees. Service members will live off-base and need to commute to and from base for work. At other times of the day there is often a relatively steady flow of people coming on- and off-base for various reasons.

Currently, there are 192 military installations in the US, spread out across 43 states (Military Advantage). Bases can only be closed through a congressionally authorized process known as Base Realignment and Closure (BRAC). The last time bases were closed via BRAC was in 2005. There have been requests submitted since then to the BRAC Commission to authorize further closures, but none have been approved (Bartels).

Relevant Federal Initiatives

There are several federal initiatives in place that provide support and establish a case for creating base bicycle plans. In addition, there is also documentation provided by the UFC that provides guidance for planning for bicycles on base.

Executive Order 13693 – Planning for Federal Sustainability in the Next Decade

Executive Order 13693 (EO 13693) was signed by President Obama on March 19, 2015. This EO revoked several other EOs that had dealt with sustainability in an effort to "maintain Federal leadership in sustainability and greenhouse gas emission reductions" (Obama 15871). The standards set by EO 13693 encourage federal agencies to embrace alternative energy sources and to examine how they are using energy and how they can improve. EO 13693 mandated that federal agencies must promote building energy conservation, efficiency, and management by reducing the energy intensity. It also includes mandates related to data optimization and monitoring. In order to measure success, a 25% percentage target for clean energy use was set for fiscal year 2025. For agencies that have a vehicle fleet, there is also a mandate to improve fleet efficiency and management in order to reduce greenhouse gas emissions from agency vehicles (Obama 15873). This EO, while not pertaining to personal vehicles of federal employees, shows that leadership is dedicated to reducing greenhouse gas emissions and recognizes the importance of making changes in order to become more sustainable. As bases work to do so, it would be logical for them to consider a comprehensive strategy that would encourage service members to reduce energy both at work and in their personal lives, especially when those people live on base. SAFB has already made efforts to encourage service members to switch to energy-efficient light bulbs. In 2011 they distributed compact flourescent bulbs to the employees that live on base, both in order to help SAFB

reach its energy efficiency goals under a previous EO as well as with hopes of teaching them "good energy-saving habits that they will use at future bases and at home" (Martin). Establishing better bicycle accomodation on base and encouraging service members to choose alternative transportation methods could be another way for SAFB to demonstrate "Federal leadership in sustainability and greenhouse gas emission reduction" (Obama 15873).

Operation Live Well and Healthy Base Initiative

Operation Live Well (OLW) is a long-term strategic planning effort established by the DoD to "align, coordinate, and integrate health and wellness initiatives into the social expectation for service members, their families, DoD civilians, retirees, and Veterans" (Department of Defense 6). The Healthy Base Initiative (HBI) is a demonstration project that was launched in 2013 as part of the larger OLW effort (pg. 6).

The need for programs such as OLW and HBI is clear. "Obesity among military personnel and their families is estimated to cost DoD more than $1.5 billion a year in healthcare spending and recruiting replacements" (pg. 10). Many bases are trying to find new ways to address this problem, as the mandatory annual physical fitness test does not seem to be sufficient (Smith). Base events such as a Biggest Loser competition, where teams compete against each other to see who can lose the most weight, are popular, as are themed 5k and 10k races. HBI consists of three themes to address the problem: active living, healthy eating, and tobacco-free environments (Department of Defense 13). One of the strategies to advance active living was to create an active living environment by promoting fitness centers, intramural sports, active transportation networks, and outdoor recreation (pg. 14). The HBI report specifically mentions that one of the easiest ways to increase daily physical activity is to bike instead of drive for daily commutes or errands

(pg. 27). HBI was pilot tested at 12 different military installations and 2 defense agencies. One of the pilot sites received funding to participate in a bike share program as part of the HBI, and once the pilot test was completed they decided to retain the bike share and incur the costs themselves (pg. 28). It is clear that the military is dedicated to promoting healthier lifestyles for its members. Promoting active transportation is one of the ways to achieve this goal, which has been acknowledged by the HBI report. If a base chose to increase bicycle facilities as a way to increase physical activity, it is helpful to have federal studies that support the initiative. This provides clear reasoning and guidance as to why this method of action may be preferrable over others.

Unified Facilities Criteria for Installation Master Planning

Currently, the UFC for Installation Master Planning mentions pedestrian and bicycle planning within the Sustainable Planning and Healthy Community Planning sections. The Sustainable Planning section within the UFC aims to create lasting development which meets the needs of the present mission without compromising the ability of future generations to meet their own needs. This section also specifically mentions goals of reducing fossil fuel use and creating more compact and sustainable communities. It calls for planners to incorporate several principles of sustainable planning in their planning document, such as compact development, horizontal mixed-use, and connected transportation networks.

The connected transportation networks section references walking, biking, and driving. Bikeways and sidewalks are recommended to be buffered and integrated with streets in order to promote safety and use. The UFC also makes recommendations for a grid network that include short blocks and eliminates culs-de-sac to ensure connectivity (Department of Defense 5-7). This recommendation is in line with the Congress for the

New Urbanism's Sustainable Street Network Principles, which aim to create safe, livable, and walkable communities (Congress for the New Urbanism). This connection to New Urbanism and emphasis on a connected network moves away from the traditional suburban sprawl patterns that bases have previously seen. In recent years, some bases that have had to renovate or completely redo their housing have chosen to embrace New Urbanism designs (Steuteville). This is, in part, due to a need for maximizing usable space on bases, as well as the need to create more livable environments to attract service members to live on base. Service members are not always required to live on base, and many choose not to due to the lack of housing options or stock. For some bases, this was resulting in a lack of customer base for on-base facilities such as the bowling alley or movie theater (Snyder). By embracing principles that help to create more livable communities, bases are hoping to encourage more service members to choose to live on base.

The Sustainable Planning section of the UFC provides a lot of support for bicycle planning within new development. However, it is less useful for existing bases that are not currently under reconstruction. New bases are not built often, and many have existing conditions that are not compatible with the current UFC. Existing street networks may contain culs-de-sac and streets that are not multimodal. In these cases, a targeted bike planning document could help to identify a bike network and connections that might not have existed before. It can also help to identify where improvements should be made once the funds become available. Identifying priority origins and destinations would be useful for a base in planning for any future improvements, and would help to maximize the effectiveness of the improvements.

The UFC also has a Healthy Community Planning section that references bicycling. It emphasizes the need for planning that creates conditions conduscive to

physical activity. Physical health is noted to be both important for reducing the effects of chronic diseases as well as being a key element of readiness – readiness is the status of always being prepared to carry out the base's mission and support national military operations if necessary. The UFC does mention that pedestrian and bicycle plans can be a component of planning on bases, but does not offer any guidance on creating these plans (Department of Defense 12-13).

The UFC's emphasis on planning for healthy communities further supports the initiatives and research carried out in OLW. Physical health should be considered as a planning consideration, and bicycle and pedestrian planning are specifically mentioned as effective strategies. If bases are not currently installing new infrastructure, creating a bicycle plan could help to fulfill the objectives identified in the UFC.

Federal Guidelines for Bicycle Infrastructure

Federal guidelines for bicycle infrastructure planning come from a variety of sources. The Federal Highway Administration (FHWA), an agency under the U.S. Department of Transportation (DOT), released a memorandum in 2013 that promoted a flexible approach to bicycle and pedestrian planning (Shepherd). The memorandum specifically endorsed three sets of guidelines that can be used when planning bicycle and pedestrian facilities. Information about the authors and release years of these guides can be found in Table 1. Because a military base is under federal jurisdiction, they would most likely have to comply with these recommendations. Luckily, the guides identified by the FHWA offer varying perspectives and many options for bicycle infrastructure planning. It is completely possible to plan a safe network that fulfills the DOT standard of

creating safe, convenient networks for all ages and abilities (Department of Transportation).

Table 1: Bicycle infrastructure guides endorsed by FHWA

Guide Author	Guide Title	Guide Release Year
American Association of State Highway and Transportation Officials (AASHTO)	Guide for the Development of Bicycle Facilities	2012, 4th Edition
National Association of City Transportation Officials (NACTO)	Urban Bikeway Design Guide	2014, 2nd Edition
Institute of Transportation Engineers (ITE)	Designing Walkable Urban Thoroughfares: A Context Sensitive Approach	2010, 1st Edition

The three guides chosen by the FHWA provide different perspectives on bicycle infrastructure planning. The AASHTO guide has long been the defacto guide for use by governmental agencies at all levels – city, state, and federal. It recommends six types of bicycle infrastructure options (American Association of State Highway Transportation Officials 2.15):

1. Shared Lanes
2. Marked Shared Lanes
3. Paved Shoulders
4. Bike Lanes
5. Bicycle Boulevards
6. Shared Use Paths

One of the main critiques of the AASHTO guide is that it does not recommend more recently popular forms of bicycle infrastructure, many of which have been proven to improve safety conditions. Some of these infrastructures include protected bike lanes, protected intersections, and sidewalk level bike lanes. This omission resulted in many cities choosing not to deviate from the prescribed designs. Bike lanes are less safe because they do not separate vehicles from cyclists, and less safe biking conditions can discourage people from biking (Schmitt, Key Design Guide to Finally Include Protected Bike Lanes). AASHTO guides are not tailored to a specific scale, and are applied to suburban and rural roads as well as urban roads. However, traffic conditions and community needs are often not the same in these areas, and not considering them separately could lead to infrastructure choices that are not context appropriate.

Many bicycle planning advocates viewed the FHWA endorsement of the NACTO guide in 2013 as a step in the right direction. The NACTO guide differs from the AASHTO guide in that it includes many more options for separated bicycle facilities, and pulls inspiration from popular European designs that have proven to be successful in other countries (Schmitt). There are several bicycle infrastructure options included in the NACTO guide, detailed in Table 2.

Table 2: Bicycle infrastructure types in the NACTO Urban Bikeway Design Guide

Facility Catgory	Facility Subtypes
Bike lanes	Conventional bike lanes, buffered bike lanes, contra-flow bike lanes, left-side bike lanes
Cycle tracks	One-way protected cycle tracks, raised cycle tracks, two-way cycle tracks
Signing and marking	Colored bike facilities, shared lane markings, bicycle boulevards

The NACTO guide includes a lot more options for bike design within urban areas, as opposed to the AASHTO guide. This gives cities more options to choose from, which can lead to a bike network that is safer and more usable.

The FHWA also endorsed the ITE guide. This guide was created through funding from the FHWA and the Environmental Protection Agency (EPA) in partnership with the Congress for the New Urbanism. This guide emphasizes context-sensitive approaches that preserve historic, environmental, community, and aesthetic resources. This guide is the FHWA's response to feedback about the lack of applicability that the AASHTO guide has in urban contexts, and aims to supplement the AASHTO guide rather than replace it. The ITE specifically only includes recommendations for urban thoroughfares and exlcudes higher-volume facilities like freeways and highways and lower-volume facilities like local streets. The guide is not only for bicycle infrastructure planning, but includes broad recommendations for creating walkable urban thoroughfares. The bike facilities mentioned in the guide are bike lanes, separated paths, and shared lanes. The ITE guide directs readers to the AASHTO guide for more guidance regarding bicycle planning (Institution of Transportation Engineers).

Of all the guides, the one that most prioritizes safety for bicyclists is the NACTO guide. This guide provides the most options for types of bicycle infrastructure and is more likely to produce a bicycle network that is truly usable for all ages and abilities. This guide will be used to help create recommendations for the proposed SAFB bicycle network.

Bike Plan Example from Scott AFB

Because many bases face similar challenges to cycling, this report sought to consult an existing base bicycle plan as precedent for the Sheppard AFB bike plan. It also is easier for a base to take on an initiative if it has already been done elsewhere. While there are recommendations for bike planning in the UFC, it was difficult to find any examples of a base bike plan. One plan that was accessible online was the Scott AFB Bicycle and Pedestrian Commuter Plan (BPCP). The Scott AFB BPCP was commissioned by the base, and produced by the Heartlands Conservancy, a non-profit organization dedicatd to "protecting and restoring the natural resources that sustain the communities of southwestern Illinois" (Heartlands Conservancy). Scott AFB is located in St. Clair County, Illinois and its primary mission is air mobility operations. Taking into account the total working force, the dependents, and the retirement population, over 46,000 people call Scott AFB home (U.S. Air Force).

Scott AFB's BPCP was produced in 2013 and received funding support from the Illinois Department of Transportation (Heartlands Conservancy). The BPCP is based on a study that was commissioned by Scott AFB that investigated the mosy suitable and appropriate routes for bicycle and pedestrian commuters. One motivation behind the study was the increasing demand for parking on the base. The BPCP also cites rising fuel

costs and public health benefits as factors that could encourage people to choose to bike or walk to base instead of driving. The BPCP hoped to provide improve safety conditions for those service members that already commute via bike or foot, and encourage additional commuters to choose active transportation. The base used previous planning and policy efforts to help inform the BPCP. These included a bike racks plan, a carpool parking policy, and a base traffic study. The BPCP also included public involvement efforts by way of an on-line survey and multiple open houses. The survey was distributed to Scott AFB employees and residents as well as surrounding communities. The first open house was used to collect initial questions and comments, and the second was to present draft recommendations and get feedback. Targeted stakeholder meetings were also part of the engagement process. The key stakeholders that were identified included a local nonprofit organization that developes pedestrian and bicycle routes, a local parks and recreation authority, and a local transit authority (pp. 12-14).

The BPCP identified plan principles that helped to guide its infrastructure recommendations for the base. They based these principles on design recommendations from the Illionois Department of Transportation as well as AASHTO's guide for bicycle facilities. The BPCP also references Complete Streets as a design principle. Complete Streets offer safe multi-modal transportation options for people of all ages and abilities. It is state law in Illinois that all new projects that receive federal funding or are on federal roadways must incorporate principles of Complete Streets (pp. 18-19).

The BPCP also incorporated cost estimates for proposed infrastructure and identified potential funding sources. Many of the funding sources identified were state-based and safety-based. Examples include the Illinois Transportation Enhancements Program and the Safe Routes to Schools program (p. 25). Ultimately, the BPCP recommended three different types of bicycle facilities: shared lane markings, improved

shoulders, and multi-use trails (p. 19). They also identified key intersections and proposed various solutions to ensure safe bicycle crossing (p. 33). As part of the plan they also propose several programming initiatives to help spread awareness about bicycling and safety. They mention the importance of the having adequate bike parking and adequate signage and wayfinding. They do not specifically mention the challenge of having limited access points to the base, but on Scott AFB there are six gates that provide access to the base at various times, some opening specifically for peak times (p. 7). This provides more options for cyclists than the two gates located at Sheppard AFB.

Scott AFB's BPCP provides an example of how a bike plan could look for a military base. It shares many elements with bike plans that cities have developed. The public involvement efforts with base members and the surrounding communities were a particular strength of the Scott BPCP. This type of engagement is important to identify community priorities and ensure that the bike plan addresses them.

Chapter 3 : Sheppard AFB Case Study - Existing Conditions

Existing Planning Documents

There are a few key existing planning documents that have helped to inform the existing conditions section. These documents are listed in Table 3.

Table 3: Relevant Planning Documents for SAFB

Document Title	Preparing Agency	Year Completed
Sheppard Air Force Base Installation Development Plan	Sheppard Air Force Base	2016
80th Flying Training Wing Campus Planning District Area Development Plan	AECOM	2018
Wichita Falls Bicycle Master Plan in 2005	Wichita Falls MPO	2005

The Installation Development Plan (IDP) is SAFB's version of a comprehensive plan and is prepared internally. The 80th Flying Training Wing Campus Planning District Area Development Plan (ADP) is for a specific area of the base and intended to supplement the IDP. The ADP was produced by a contractor. The Wichita Falls Bicycle Master Plan was made by the Wichita Falls MPO and was included as a chapter within the Metropolitan Transportation Plan.

Sheppard Air Force Base

SAFB is the site selection for the case study analysis. SAFB is an access-controlled military installation of approximately nine square miles, located on the northeast side of Wichita Falls, Texas (82nd Training Wing, Sheppard Air Force Base 5.2). Figure 1 shows the relative size of SAFB compared to Wichita Falls as well as its geographic location.

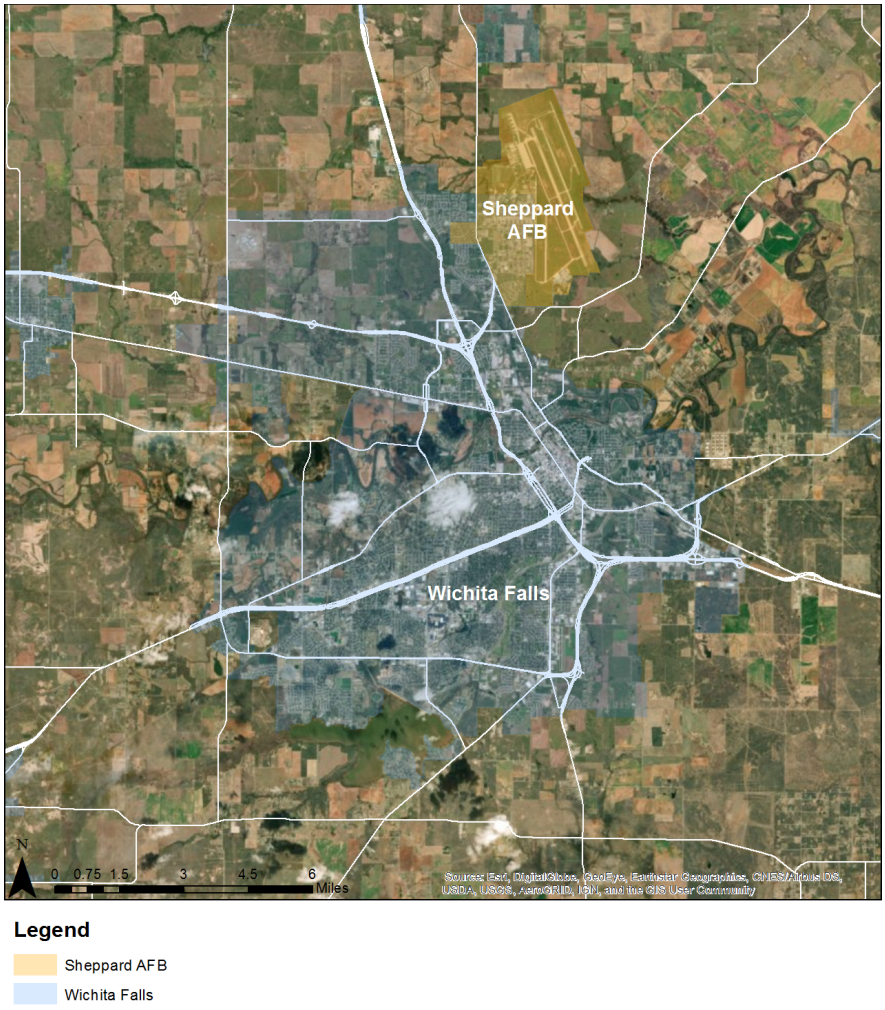

Figure 1: Wichita Falls and SAFB

Wichita Falls is located in north Texas, approximately 150 miles northwest of the Dallas/Fort Worth metro region and less than 20 miles from the border of Oklahoma, as seen in Figure 2.

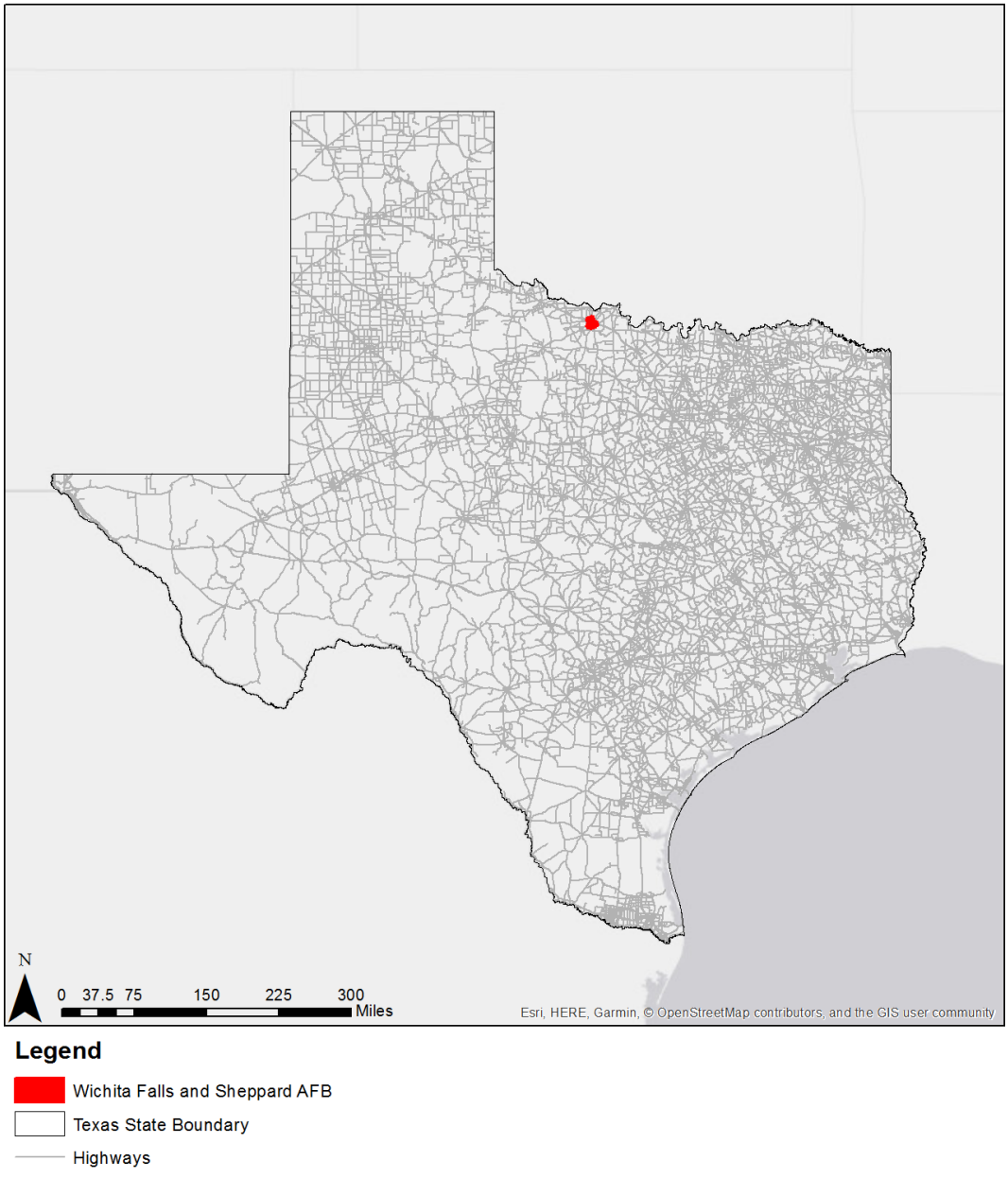

Figure 2: Wichita Falls location in Texas

SAFB was established in 1941 and is home to the 82nd Training Wing and the 80th Flying Training Wing (Brig. Gen. Jolly). Technical training, or Tech School, is the training that service members receive after completing the initial 6-week boot camp that all Air Force service members must complete. The training courses generally range from 6-72 weeks in length, and once completed the service members are no longer in training and are assigned to a new base (U.S. Air Force). The airmen that are in technical school are known as Airmen in Training (AiT) and are often in their late teens or early 20's. SAFB offers training for pilots as well as support staff in fields such as aircraft maintenance, logistic support, and civil engineering (U.S. Air Force). In FY2015 SAFB graduated over 60,000 AiT (U.S. Air Force).

The AiT live in conditions very similar to those of college students. They reside in dormitories, eat most meals at a mess hall, and must follow curfew and other similar regulations. AiT are not usually allowed to have personal vehicles, and must rely on walking, biking, and bus services that are provided specifically for them to navigate the base (Powers). In addition to the large number of AiT at the base, there were also 2,932 permanent military personnel and 2,038 support personnel at the base in FY2015. SAFB is the largest employer in Wichita Falls, and produces a $5.6 billion economic output in Texas (82nd Training Wing, Sheppard Air Force Base 3.4).

SAFB is bounded to the west by a major road that changes names from Burkburnett Rd to Burk Rd as it continues north past the base. To the east it is bounded by open space. Points of interest on SAFB can be seen in Figure 3. The base's amenities and housing are located on the west side of the base, while the flightline is located on the east side. There is base housing located in four different places on SAFB. Dormitories for AiT are located within the 82nd Training Wing campus and the 80th Flying Training Wing campus. There are also two additional base housing communities for other service

members. One is located on the south side of the base, and the other is located across Burk Rd. The housing community located across Burk Rd has its own access gate and is not open to the public. It is accessible only from Burk Rd. The community services on base, such as the commissary, chapel, and post office, are located on the south side between the 82nd Training Wing campus and base housing community.

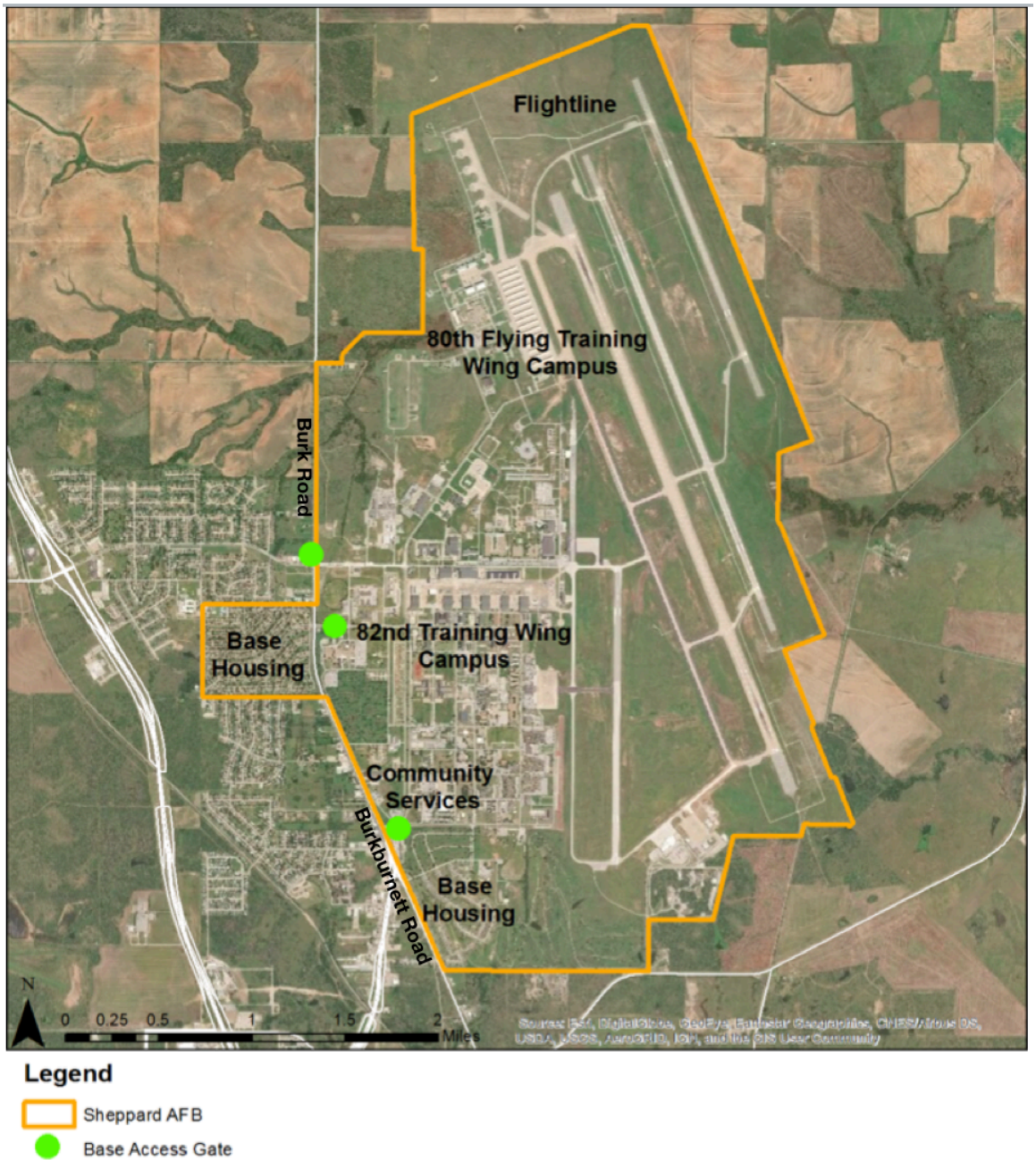

Figure 3: Points of Interest on SAFB

The SAFB Installation Development Plan (IDP) was released in December 2016 with a planning horizon of 20 to 30 years. The IDP is a guidance document for future programming decisions for SAFB. It is the result of a comprehensive planning process, and is a living document that is reviewed, updated, and approved every year. The IDP is intended to "define ideal development principles for maximizing the installation's long-term capabilities" (82nd Training Wing, Sheppard Air Force Base 3.1) As part of the IDP, SAFB developed a strategic vision statement:

"Sheppard Air Force Base is the world's premier international training installation. Its compact layout, flexible facilities, and walkable central campus support current and emerging missions" (3.2).

This statement is the result of a strategic vision alignment process, which ensures that the individual mission of SAFB aligns with the priorities identified by higher-level entities such as the DOD. The specific vision for SAFB was created during a vision workshop that consisted of SAFB stakeholders. It is further broken down into goals and objectives that are used as guiding principles throughout the rest of the plan. The four goals identified are:

1. Continue to consolidate the footprint
2. Ensure Facilities are planned and sited with a focus on user requirements and functional context
3. Incorporate flexible facility designs to accommodate changing mission needs
4. Consolidate infrastructure into utility cooridors (p. 4.3)

These goals do not specifically reference bicycle planning, but they detail development strategies that would ultimately help to create a more bikeable environment.

The IDP contains a high level of detail on the current condition of the base's physical assets and the recommended short-, medium-, and long-term capital

improvements. The road network is one of the physical assets that is evaluated. Two of the major constraints identified were the high potential for pedestrian and vehicle conflicts and insufficient sidewalks. Bicycling conditions were also noted as being dangerous because of the narrow roadways and lack of dedicated cycling space (9.33). In order to address these constraints the IDP proposes a peripheral loop road system that would designate an existing road as the primary road for vehicles. Vehicles would still have access to interior roads, but they would be classified as secondary roads (7.9). The IDP also mentions that all road improvements beginning after 2017 will include on-street painted bike lanes (9.33). No additional bike infrastructure is noted in the capital improvements section.

The fitness centers on base were also evaluated as physical assets in the IDP. They were found to be undersized based on current demand. There are two primary fitness centers, and combined they are approximately 20,000 square feet below what is authorized for an installation the size of SAFB. Adding a track and pool to one of the fitness centers has been considered but no plans have been made (7.17). Through initiatives previously mentioned in this paper, such as the Healthy Base Initiative (HBI), bike riding has been proven to be a productive form of exercise for service members. Providing a safe network and encouraging people to ride bikes could provide an additional fitness outlet for the base.

The IDP also evaluated operational assets, including base access. The IDP categorized base access as having degraded capacity. The base access is considered degraded because of its inefficiency during peak times, which averages to 380 vehicles per hour entering the base. Queues often form along public roads and cause delays for people getting on to the base (7.10). Increased traffic at the access gates during peak

times could pose an increased risk of conflict between bicycles and vehicles. Addressing this issue in a bike plan could help to reduce the conflict.

The SAFB IDP also provides details about how the base intends to reach the sustainability goals identified in EO 13693. The base developed a set of Sustainability Development Indicators (SDIs) that will be used as a tool to measure progress and predict future needs and capacities. One of the SDIs is energy use, which is identified as an SDI because energy use contributes to greenhouse gas emissions. SAFB is currently failing to meet its strategic goals in terms of energy use, and had increased its use in FY2016 compared to FY2015. The base is currently making energy-efficient upgrades to buildings, but encouraging alternative transportation on base could help reach future goals of energy use reduction (8.3).

Within the Future Development Planning section of the IDP the existing and proposed transportation networks are discussed. According to information in the IDP, there have been discussions between the Wichita Falls Parks and Recreation Department and SAFB about the possibility of connecting an existing trail in Wichita Falls to SAFB. As of 2016, two potential routes were being considered that would connect to one of the two access gates at the base (9.32). However, there is no information from the Wichita Falls Parks and Recreation Department that provides more recent updates on the project.

The 80th Flying Training Wing Campus Planning District Area Development Plan (ADP) also provides relevant information for bicycle planning on base. This plan is for the 80th Flying Training Wing campus that is located in the northeast corner of the base. For planning purposes, the base is split into different planning districts based on land use. Within the 80th Flying Training Wing campus, there are currently no dedicated pedestrian trails or bicycle paths internally, and additionally there are no pedestrian or bike connections to the rest of SAFB (AECOM 2.14). One of the priorities identified as part of

the ADP is to improve the pedestrian and bicycle network. In order to achieve this, there is a proposed pedestrian network. There is no proposed bicycle network due to the lack of current bicycling activity on this area of the base, but the plan proposes to identify key collectors that are suitable for bicycles and install signage that will indicate that these roads are meant to be shared between vehicles and bicycles (4.6). The plan also includes a form-based planning section that states that bicycle lanes should be incorporated into the road network where possible and bicycle infrastructure should be included as part of overall site development (5.1). Because this plan is only for one planning district on the base, it could result in an unfinished or piecemeal bicycle network. Not all planning districts have individual plans and will only follow the general guidelines for development put forward in the IDP. In order to create a cohesive bicycle network it is necessary to look at the base as a whole.

Wichita Falls

SAFB is known for having a strong relationship with the surrounding community of Wichita Falls, which in 2012 received an award from the Air Force for outstanding community support (82nd Training Wing, Sheppard Air Force Base 5.6). Since not all service members stationed at SAFB are able to live on base, some end up living in Wichita Falls. Service members who do live on base will likely travel off base to access restaurants, shopping, schools, and other amenities.

Wichita Falls would also be an important partner for SAFB to engage with when creating a bicycle plan because it is home to an annual bike race called the Hotter'n Hell Hundred (HHH). The four-day event attracts over 13,000 riders from across the globe, including teams from SAFB. The Wichita Falls Bicycling Club and the Wichita Falls

Streams and Valleys organization oversee the races (Hotter'n Hell Hundred). This is a huge event that transforms the city while it is occuring, and is even mentioned in the SAFB IDP as a community interest to consider (82nd Training Wing, Sheppard Air Force Base 5.6). The HHH route starts in downtown Wichita Falls and loops around the surrounding county area using existing roads, ending in downtown where they started (Hotter'n Hell Hundred).

The HHH was one of the drivers for the Wichita Falls Metropolitan Planning Organization to create a Bicycle Master Plan in 2005. The plan also cites demand for alternative transportation options, demonstrated interest from residents of Wichita Falls in using bicycles for daily trips as well as recreation, and a need for safer facilities for bike riders as reasons for creating the plan (Wichita Falls Metropolitan Planning Organization). The plan propsoes a network for Wichita Falls that will help to service existing and planned bicycle trails. A current map of existing bicycle trails in Wichita Falls can be seen in Figure 4 and the proposed trail system from the Bicycle Master Plan can be seen in Figure 5. The plan cites SAFB as a bicycle traffic generator and proposes a cross-town route that would connect SAFB with other points of interest in Wichita Falls (Wichita Falls Metropolitan Planning Organization 14-22). These existing planning efforts indicate that it would be important to include Wichita Falls in the bike planning process for SAFB. There is support from the local community for bike infrastrucure to connect SAFB and Wichita Falls, and SAFB could contribute to this effort by creating their own bike plan. It would be difficult for Wichita Falls to plan a bike network alone that provides connections to SAFB, because they do not have jurisdiction over the base.

In addition to the Bicycle Master Plan, there are also bicycle safety intiatives put into place by the city, including the Bike Safe Program and Safe Routes to School. Both of these programs are aimed at creating safer environments for children and students and

educating them about biking and walking safety (Wichita Falls Texas). Similar programming would be beneficial to include in a bike plan for SAFB, and Wichita Falls could provide useful guidance on how they implemented these programs.

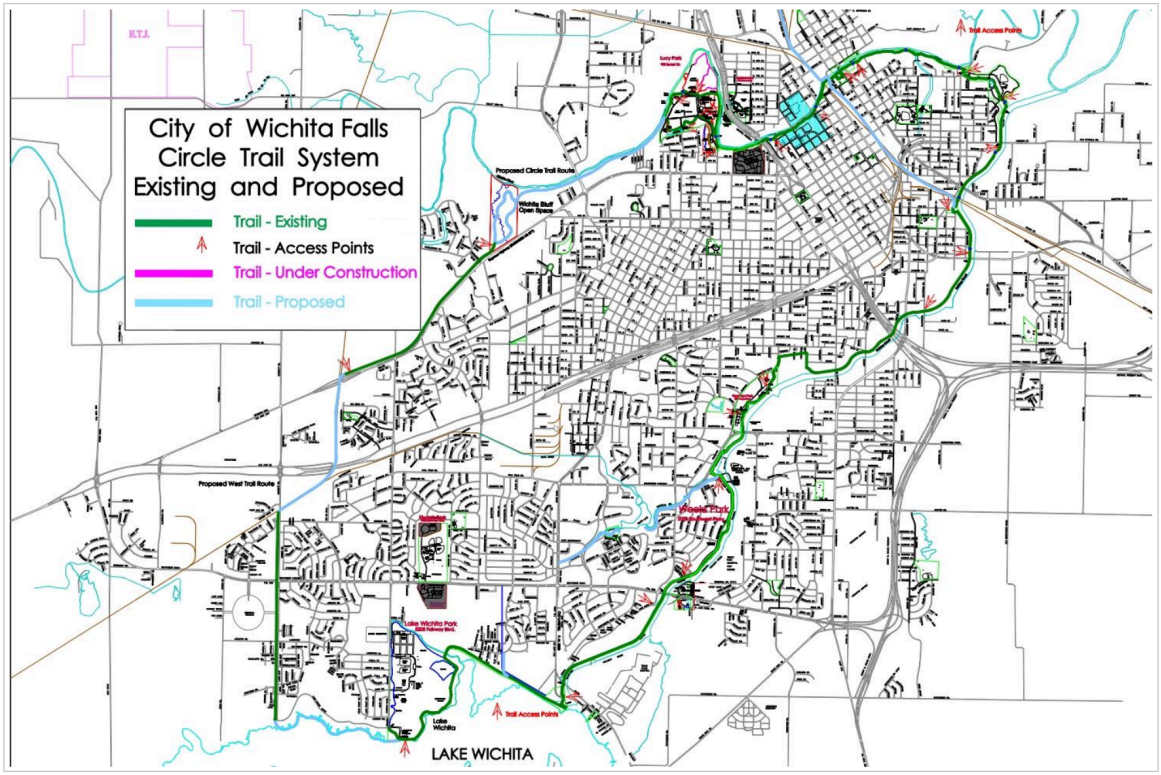

Figure 4: Existing Wichita Falls trail system

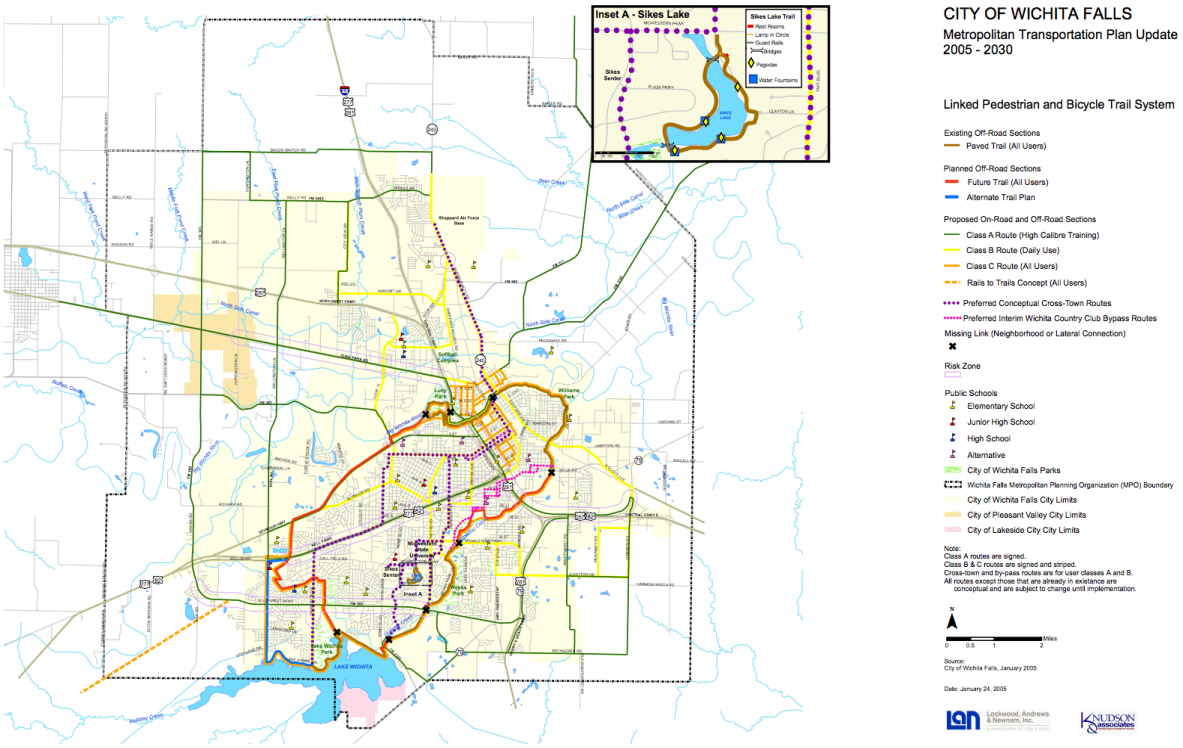

Figure 2: Proposed Wichita Falls trail system

Chapter 4: Sheppard AFB Case Study Recommendations

Methods

The recommendations for bicycle infrastructure on SAFB were made after taking all of the information from the previous chapters into consideration. The federal policies and programs outlined offer the necessary high-level support for a biking initiative by the base. This is crucial because SAFB must align its goals with those of higher authorities, as is evidenced by its strategic vision alignment process within its IDP. A bike plan offers a way for service members to be more active, which aligns with the Healthy Base Initiative (HBI) and addresses the obesity problem that the military is currently facing. Increased biking could also reduce vehicle use on base, which could help to lower greenhouse gas emissions on base and satisfy priorities identified in EO 13693. More compact bases, encouraged by federal guidance, also are inherently more bikable, as people are more likely to choose biking for shorter trips.

The potential bicycle network for SAFB, seen in Figure 6, was planned using information from the SAFB IDP. The different land uses on base were taken into consideration, and areas that were less compatible with bikes, such as the flightline, were not included in the network. There are also small, internal streets within the grid network on base that were not included in the network because the IDP identified them as future potential pedestrian-only streets. The main roads that border the base to the west, Burk Rd and Burkburnett Rd, were also included in the proposed bike network because they provide an important connection to Wichita Falls and will be used by people travelling to or from base.

The NACTO Urban Bikeway Design Guide provided guidance for choosing bicycle infrastructure for SAFB. The three types of infrastructure chosen can be found in

Table 4. These infrastructures were chosen based on the existing road conditions as well as the planned improvements or recommended improvements that were mentioned in any one of the planning documents for SAFB or Wichita Falls. Looking at both the NACTO guide as well as existing planning documents helped to choose infrastructure types that were appropriate for the context of SAFB and the surrounding communities.

Table 4: Proposed infrastructure types for SAFB

Infrastructure	Road Conditions for Use	Features
One-way protected cycle track (cycle track)	Multiple lanes, high speeds, high traffic volumes	Street level, physical barrier from vehicle traffic, colored pavement, striped markings
Bike lanes	Low speeds, lower traffic volumes	Street level, striped markings, colored pavement
Shared lanes	Identifying streets as bikeways, low speeds, low traffic volume	Street level, arrow markings (sharrows)

Planning Opportunities and Constraints

In determining whether a bike network was appropriate for SAFB, the planning opportunities and constraints were examined. The main opportunities at SAFB that provide support for planning a bike network are the importance of physical health in the military, the bike planning guidance in the Unified Facilities Criteria (UFC), and the existing bicycle presence in Wichita Falls. Improving physical health for service members is a priority identified by the DoD that applies across all branches of the military. Initiatives such as Operation Live Well (OLW) and the Healthy Base Initiative (HBI) demonstrate the DoD's dedication to addressing this problem. This offers an opportunity for bike planning because it would increase the active transportation options

on base, which is one of the strategies for improving the health of service members that was identified by the HBI.

The UFC contains broad recommendations for including bicycle facilities in base planning, which provides space for bases to decide how much attention they want to give to bike planning. Allowing bases to develop context-specific bicycle facilities and plans provides the opportunity for them to create more effective and usable bike networks. This freedom that the UFC provides is only an opportunity if taken advantage of. It could also be used to avoid creating specific bicycle plans.

The existing bike presence in Wichita Falls provides another opportunity that is more unique to SAFB. The Hotter'n Hell Hundred (HHH) race that takes place every year draws over ten thousand cyclists to town. Wichita Falls, and by extension SAFB, is more familiar than the average city with bicycling. The town created a Bicycle and Pedestrian Master Plan that supports creating more permanent infrastructure in town for bicycles. Many SAFB employees live in Wichita Falls and the two communities have a notably positive relationship. It is reasonable to conclude that the existing community support for cycling would help to drive forward a bike plan for SAFB.

The main planning constraints for SAFB are the limited access points and the presence of potentially hazardous materials. There are two strictly controlled gates that provide regular access to SAFB as well as a third gate that is open for special events only. Military members and civilians with base access are required to show ID at the gate and the gates must be staffed at all operating times. This can cause a bottleneck, and often does cause traffic problems for SAFB. All of the gate locations can be seen in Figure 3, indicated with green circles. Base access gates usually have lanes for cars as well as a sidewalk for pedestrian access. Without clear signage, it can be unclear whether cyclists should ride through with traffic or dismount their bikes and walk them through the

pedestrian access point. If cyclists have to dismount and walk through this could be a deterrant for cyclists because of the added hassle. This could be addressed by making it clear that cyclists should remain on their bikes and keep ID cards in an easily accessible location so they can go through the access gate with minimal disruption to their ride. This would also help to make cyclists more confident and comfortable about where they belong on the road, and could ease any tension between cyclists and motorists that might arise from sharing lane space. An additional access challenge to be addressed at SAFB is the base housing community that is separate from the base, located across Burk Rd. Continuing the bicycle network into this part of the base is important to provide access for the service members who live there. Creating safe crossing conditions across Burk Rd for cyclists will be a necessary element of a bike plan. The access gate that goes to the base housing is directly opposite the base access gate that is only open for special events. This means that service members cycling from the base housing development would need to travel along Burk Rd or Burkburnett Rd to get to one of the other access gates. Some solutions to this challenge would be to either provide adequate infrastructure to allow cyclists to safely access the other two gates from this base housing community, or to open the gate directly opposite the community during peak travel times. Ideally, a combination of both solutions would be used to address this problem.

Another challenge for military bases is the presence of hazardous or potentially hazardous materials, and the presence of land uses that are less compatible with bicycle infrastructure. Some of the land uses that are present at SAFB that could be a potential conflict are munitions storage, airfield operations, and industrial. These are land uses that require a higher frequency of large trucks and vehicles. This constraint could be addressed by recommending a separated, off-street bicycle path instead of an on-street separated lane. The airfield also poses a potential health risk for cyclists due to the

exhaust from airplanes. This constraint is harder to address, and could best be mitigated by avoiding putting infrastructure within the take-off or landing flight paths. There are also some operational constraints such as explosive safety zones and mandatory antiterrorism setbacks from roadways. These constraints could affect the amount of space available for bicycle infrastructure. Specific details about which areas have restricted access are not available to the public, but would be important information that base employees could provide more context on when planning the bike network.

Proposed Bicycle Infrastructure for SAFB

The proposed infrastructure map for SAFB can be found in Figure 6. This shows an aerial view of the base with the three different chosen infrastructure types indicated by three different-colored lines. The locations for the different infrastructure types were chosen based on the road conditions detailed in Table 4.

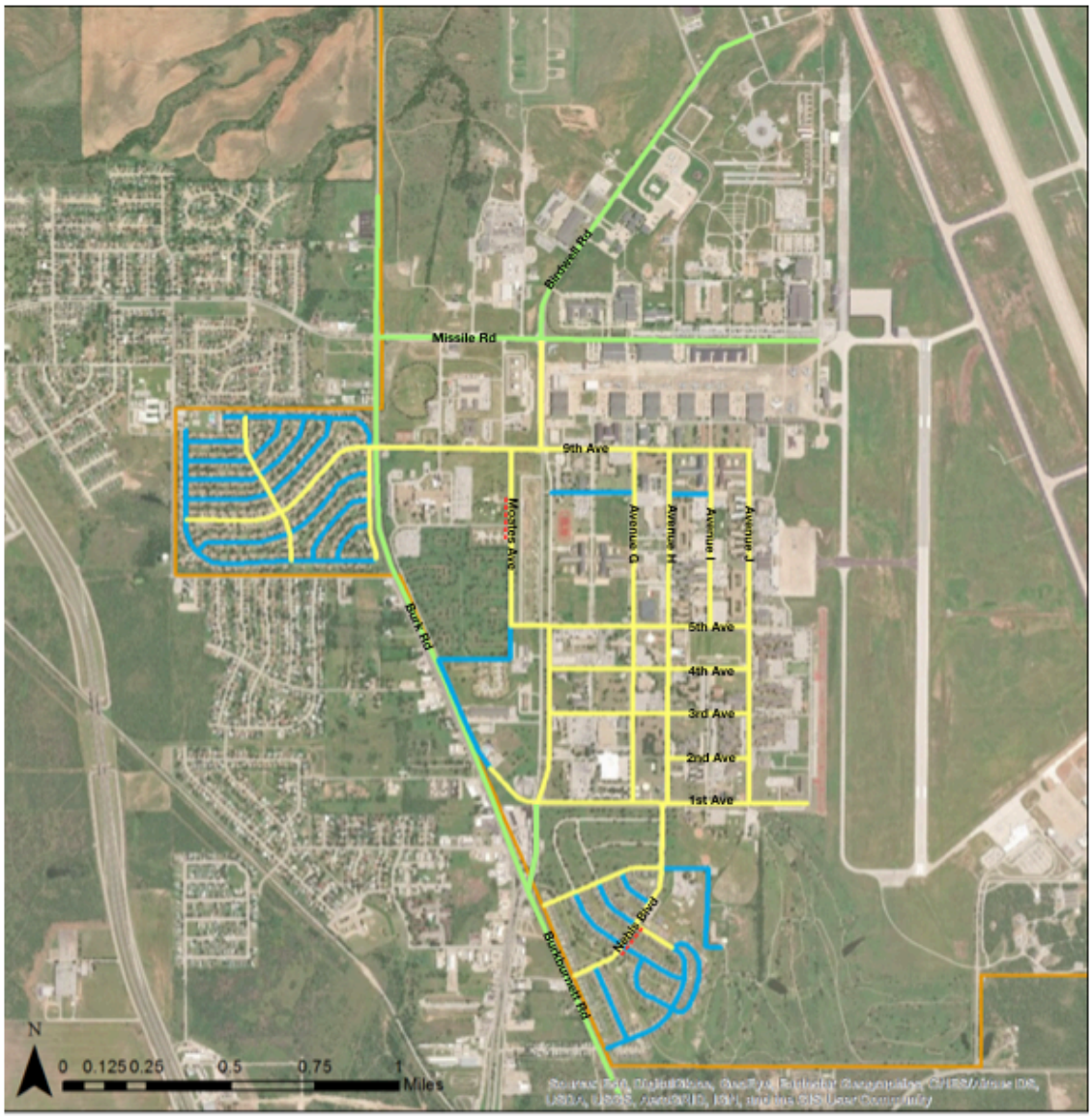

Figure 3: Proposed bicycle network for SAFB

Separated One-Way Cycle Tracks (Cycle Tracks)

In the Wichita Falls MPO Bicycle Master Plan, Burk and Burkburnett roads are designated as Class B Routes, which means that they are expected to be used daily and should be signed and striped (Wichita Falls Metropolitan Planning Organization). The roads have a speed limit of 45 mph and consist of four lanes of traffic, two going in each direction. Taking this information into account, the recommended infrastructure chosen from the NACTO guide is the cycle track. Cycle tracks were also chosen for roads that have higher volumes of traffic but lower speeds, such as Missile Road and Birdwell Road. An example of the cycle track would look like can be seen in Figures 7 and 8, showing the existing conditions on Burk Rd and a cross-section of what the cycle track would look like, respectively. The right of way for the road is currently 70 ft total with 12 ft travel lanes and shoulders on either side of the road. The empty space seen to the left of the road in Figure 7 is not usable because it is part of the required setback for the base. In order to accommodate a cycle track, the lanes were reduced to 10 ft in width and the shoulders were removed. The recommended 6 ft cycle tracks are located on either side of the road and are physically separated from traffic via a 3 ft buffer that includes a bollard. Bollards are recommended due to the speed and heavy traffic of the road and provide a visible and physical reminder to cars to stay out of the cycle track. In addition to the bollards, green colored pavement would be used to further delineate the cycle track as separate from the travel lanes. This is an additional safety measure that would help to increase the visibility of the bike lane to motorists and cyclists (National Association of City Transportation Officials 120).

Figure 4: Facing southbound on Burk Road, existing conditions

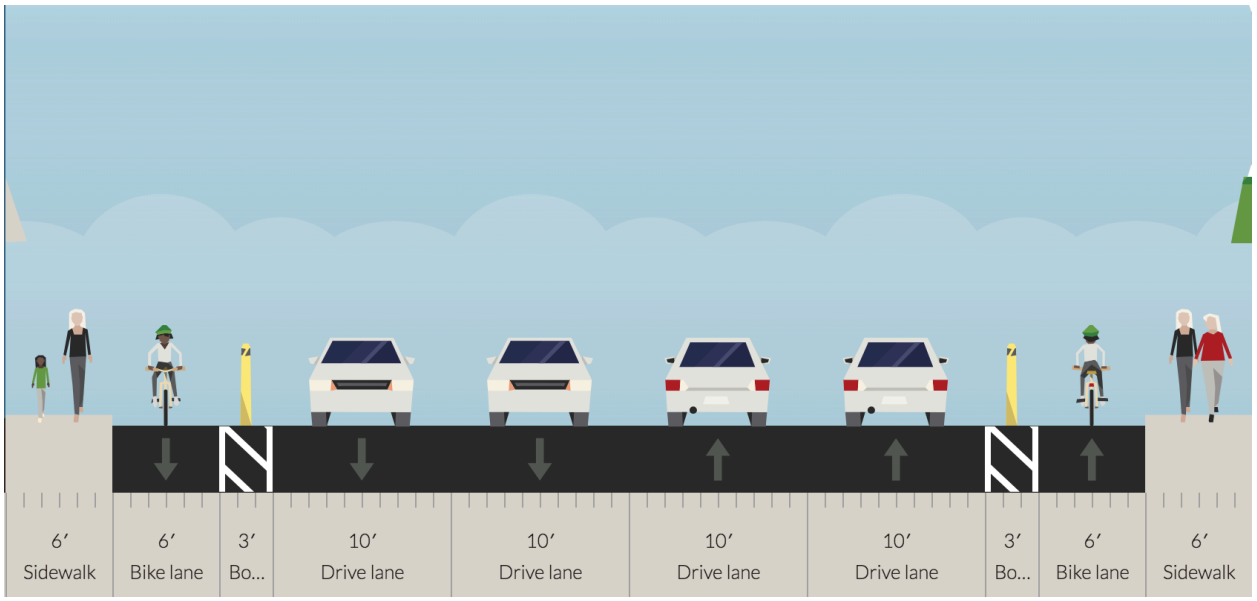

Figure 5: Proposed bicycle infrastructure on Burk Rd

Bike Lanes

The bike lanes are not separated by a buffer from vehicle traffic but they are striped and would also include green colored pavement to indicate dedicated space for bicyclists. Bike lanes were chosen for roads that were lower in speed and have moderate to low traffic, depending on the time of day. On base, the default speed limit is 30 mph unless posted otherwise and is lower in residential areas, usually 20 mph or less. The roads recommended to include bike lanes in the SAFB propsoed bike network service base amenities like the commissary, base exchange, pool, and dining hall. The location chosen for a cross-section of a bike lane is 9th Avenue, which runs east to west across the base and also connects with the base housing community located across Burk Rd. An aerial view of the existing conditions on 9th Ave can be seen in Figure 9. 9th Ave consists of 60 ft of right of way with four travel lanes, two going in each direction. Currently each lane is 11 ft in width, and there is a sidewalk located on the westbound side of the road only. The sidewalk is separated from traffic via a planted buffer. A cross section of what 9th Ave would look like with bike lanes is seen in Figure 10. In order to make room for the bike lanes, the lane widths were reduced to 10 ft and the buffer was removed from between the road and the sidewalk. The sidewalk remained on the westbound side of the road only. The bike lanes are 7 ft in width in order to give the cyclists more comfort when riding. The bike lanes would also be painted green to further delineate the space for bicycles.

Figure 6: Aerial view of 9th Avenue, existing conditions

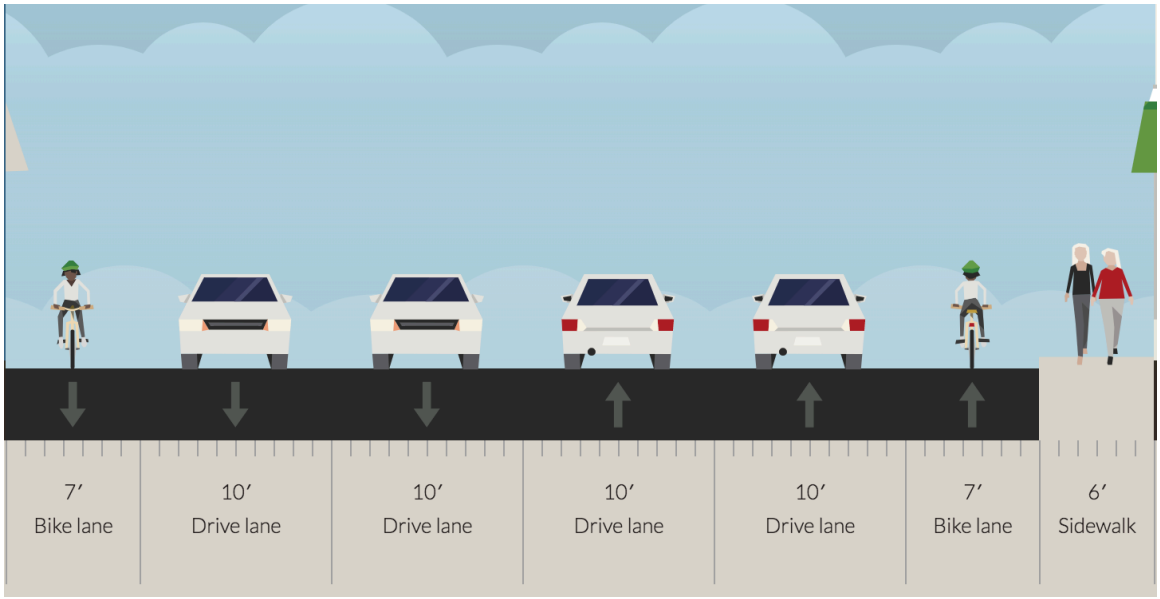

Figure 7: Proposed bicycle infrastructure for 9th Avenue

Shared Lanes

Shared lanes are lanes that are shared between bicycles and vehicles. They are indicated by either posted signage or markings on the pavement. Shared lanes were chosen for streets that have lower speed limits or lower traffic volumes, such as residential streets or back streets. Indicating that lanes are shared helps to create a sense of connectivity throughout the base and helps to create a welcoming atmosphere for bicyclists. The roads on SAFB chosen for shared lanes are either residential streets, side streets, or back streets. These are all roads that are not heavily used or have very low speed limits. Sharrows were chosen for these streets instead of bike lanes because they do not pose a dangerous environment for cyclists, and the right of ways are smaller, making it more difficult to physically accommodate bike lanes.

Base Access Points

Currently, the two access points for the base are outfitted for vehicle traffic only. In order to accommodate and encourage more people to bike to base, the bicycle infrastructure would be need to be integrated into the current design. Figure 11 shows how that could look for the Missile Gate located on Missile Rd. Leading up to the gate, Missile Rd has two lanes, but they split into three to allow for more ID checkpoints. The stars indicate where guards would be stationed in order to check ID cards through the driver's side front window. The bike lane cannot continue through the gate on the right side of the road because it would position them on the opposite side than the gate guard, and they would need to dismount their bike and cross the road. Instead, if the bike lane terminated into a shared lane before the entrance gate the bicyclist would be able to merge with vehicle traffic and remain on their bike when they pulled up to have their ID checked. Speeds at an entrance gate are already slower, especially at peak times, but to

ensure a safe merge process a visual indicator should be present to alert drivers that the bicycle lane is ending and this is now a shared lane.

Figure 8: Proposed bicycle infrastructure for the Missile Gate entrance

Other Physical Improvements

In addition to the bicycle infrastructure, there should be other physical improvements made to enhance the bicycle network and comfort of cyclists. One such improvement would be increasing bicycle parking, particularly around points of interest. Both short-term and long-term parking options should be considered. Some of the recommendations from NACTO for short-term parking bike rack design include:

- Accommate high security U-locks
- Provide adequate distance between spaces
- Do not make the user lift the bicycle off the ground

Long-term parking facilities should provide protection from weather and would most likely only be needed around the dorms for AiT.

In addition to parking, wayfinding signs for cyclists should be installed. These signs would indicate where points of interest are, as well as the best way to get there via bike. Signs can also be an important visual reminder for vehicles to be aware that bikes are likely to be present.

Proposed Programming for SAFB

In addition to the proposed infrastructure changes, programming efforts should be made in order to encourage people to use bicycles more and educate those who are unfamiliar with cycling. One example of successful programming comes from Joint Base Lewis-McChord in Illinois. GO Lewis-McChord is a transportation entity that operated under the umbrella of the base. They offer shuttle services for service members and their families to travel on and off base, as well as bikes that are available to rent for free with a valid ID card. In addition to providing bikes, GO Lewis-McChord provides maps of bike trails, webinar events about safe biking, and hosts events to engage with the community about their transportation options (Joint Base Lewis-McChord). SAFB could also benefit from a community-led organization that promotes safe bicycling habits and encourages people to ride bikes. Events such as community rides, themed rides, and bike to work days are examples of ways to encourage community members who may be frequent bicyclists to participate.

Another programming effort that could be made is to offer bike servicing equipment at the base auto shop. The auto shop on base provides a garage and necessary tools for people to perform their own maintenance on their vehicles. The auto shop hosts

classes through the Auto Skills Center, which teaches a basic automobile maintenance class (Varga). Accommodating bicyclists by stocking tools necessary to perform maintenance on a bikes as well as offering a beginners bike maintenance class would be a great way to provide support for bicyclists on base.

Chapter 5: Conclusion

The military has done a good job at identifying priorities for future base development and growth. However, identifying priorities is only useful if they are then put into action. Initiative such as OLW and the UFC provide the federal directives and support necessary for a military base to engage in bicycle planning, but they must take some initiative in following through. The military has already taken steps to demonstrate its commitment to promoting an active lifestyle and planning for more compact, livable bases, through the HBI and the UFC, and creating bicycle plans for bases could be another extension of those efforts. Within an IDP there are many other elements that must be considered, and the pedestrian and bicycle element can get lost. By creating a dedicated plan, a base can demonstrate its commitment to creating a more bike-friendly base. This type of visible support from leadership is extremely helpful when promoting new ideas to base members. People who already cycle on base will feel supported, and people who are unsure about cycling will hopefully feel encouraged.

SAFB's proposed bicycle network would allow people to navigate the base more safely and comfortably via bike. If SAFB were to take the initiative to create a bike plan, they could also act as a catalyst for Wichita Falls to either update the MPO Bicycle Master Plan or to create a city bicycle master plan. If these two entities were to work together in this endeavor, it could help to create a cohesive network that would allow SAFB employees who live on base to more easily access the amenities in Wichita Falls. This would provide better transportation options for service members while also increasing patronage at the establishments near SAFB.

Military bases have in their toolbox the precedent, support, and authority to prioritize biking by creating bicycle plans. They ought to prioritize it as one of the necessary elements that will help create more livable, sustainable bases.

List of Acronyms

AASHTO – American Association of State Highway and Transportation Officials

AFB – Air Force Base

AiT – Airman in Training

BPCP – Bicycle and Pedestrian Commuter Plan

BRAC – Base Realignment and Closure

DoD – Department of Defense

EIS - Environmental Impact Statement

EO – Executive Order

FHWA – Federal Highway Administration

HBI – Healthy Base Initiative

HHH –Hotter'n Hell Hundred

IDP – Installation Development Plan

MPO – Metropolitan Planning Organization

NACTO – National Association of City Transportation Officials

OLW – Operation Live Well

SAFB – Sheppard Air Force Base

UFC – Unified Facilities Criteria

WFMPO – Wichita Falls Metropolitan Planning Organization

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